

book develops the fundamental ideas of trigonometry, vector geometry, mechanics, and the calculus. Considerations of space have made this section somewhat brief, but it should prove useful to those who regard it as an introduction to more advanced text-books.

(3) The distinguishing feature of this work is the early introduction of the equations of curves of the second and higher degrees. It is an undoubted fact that if a student is compelled to make himself thoroughly familiar with the analytical geometry of the straight line and circle before proceeding to other loci, he finds it hard to appreciate the purpose and the value of the work in which he is engaged. The boy who intends to specialise in mathematics will not derive any harm from pursuing this course; in fact, there is much to be said for giving him a sound grounding in the elementary principles at the outset; but those who are taking scientific or engineering courses, and therefore require less manipulative skill, secure what they need from a course which is less detailed and more general in character. Their requirements are met admirably by such a treatment as is given in the work before us. This will be made clear by a brief enumeration of the subjects and the order in which they are taken: (1) standard equations of the straight line, circle, ellipse, parabola, hyperbola; (2) gradient of curves; (3) locus problems; (4) polar coordinates with applications to the limaçon, cardioid, cycloid, etc.; (5) the conic based on the focus-directrix definition; (6) the solid geometry of the plane, straight line, and simple curved surfaces.

There is an excellent collection of examples, answers to which are given at the end of the book. We would suggest that an index should be added in future editions.

(4) During the last ten years a number of valuable reports on the teaching of elementary mathematics have been issued by the Mathematical Association, and they have exercised a very considerable influence on the curriculum and the methods employed. As evidence of this it is necessary only to refer to the changes which examining bodies have made in their regulations and to the alteration in character of modern text-books. The present work is based on the report dealing with the teaching of arithmetic in preparatory schools. Concrete and abstract questions are taken side by side, those parts of the subject which are of small intrinsic importance are omitted, and the artificial divisions of the subject-matter into a number of standardised types of problems are avoided. We have no hesitation in recommending this book for use with junior students.

(5) This pamphlet describes a means of

exhibiting three-dimensional figures, examples of which were shown at the International Congress at Cambridge last August. Two perspective figures are drawn close together on the paper in the complementary colours green and red, and they are viewed through red and green transparent screens. A highly striking effect is obtained. It is clear that the simplicity of the method will contribute largely to its practical utility. For purposes of demonstration, in the teaching of solid geometry, it should be invaluable. About thirty examples are given; the diagram which represents a cube with one diagonal vertical with its plan and elevation is particularly good. The figures of the cylinder seen from one end and the section of a tetrahedron by parallel planes appear to be a trifle out of drawing.

OUR BOOKSHELF.

Télégraphie sans Fil: Reception des Signaux horaires et des Télégrammes météorologiques.

By Dr. Pierre Corret. Pp. 93. (Paris: Maison de la Bonne Presse, n.d.) Price 1 franc.

THIS little volume gives simply-worded directions for the construction of apparatus that will enable persons interested to make use of the time signals dispatched regularly from the wireless telegraph station at the Eiffel Tower. The author begins with a description of the very simple apparatus required by a Parisian amateur, and gives a clear account, with fully detailed examples, of the time signals and the meteorological messages from the tower. From his story of a day's programme of the tower, including as it does telegraphic exercises with other French stations as well as regular service messages, it would appear that the amateur in the French capital has excellent opportunities of learning Morse with a very small outlay on apparatus.

The next two sections of the book give instructions for erecting a receiving station of sufficient sensitiveness to pick up the messages at distances of two or three hundred miles from the tower. These directions are plain and sufficient. With the apparatus described, a French amateur may listen to a great variety of Spanish, Italian, German, and English messages; and an entertaining programme is made out for him in the book. Here the information conveyed is just such as will help those amateurs who are in a state of mental fog as regards the origin of the signals they listen to, and the information will be almost as useful to English as to French amateurs. The book closes with an account of the system of signalling time adopted by the international conference of October last.

It is intended that different stations shall transmit certain signs at different hours. Those normally audible in England are Paris at midnight and 10 a.m., Norddeich at midday and 10 p.m. At present, it may be remarked, the Paris signals indicate 10.45 a.m. and 11.45 p.m.

The receipt of these time signals is so easy a matter that every observatory, and every other institution or person needing accurate time, ought to take advantage of them.

(1) *School Gardening, with a Guide to Horticulture.* By A. Hosking. Pp. xi+326. (London: W. B. Clive, 1912.) Price 3s. 6d.

(2) *Plant Geography.* By Prof. G. S. Boulger. Pp. viii+136. (London: J. M. Dent and Sons, Ltd., 1912.) Price 1s. net. (The Temple Primers.)

(1) MR. HOSKING has produced a useful book, or rather three small books, under the title of "School Gardens." The second part deals with soils, manures, and the cultivation of garden crops; while part iii. is devoted to garden pests and miscellaneous information.

Part i., which gives the title to the book, is to us the section of most interest and value, and we would gladly have seen it expanded at the expense of the other portions of the book which require treatment on a more generous scale. On the subject of school gardens the author can speak with a full experience, and his practical details throughout are concise and thoroughly to the point.

The school garden must not be considered in the light of a paying venture. Its value will only appear when the pupils have become settled in life; then the stimulus to observation and method and the interest in outdoor pursuits they received will be fully appreciated, and the experiment will reap sufficient reward.

(2) In the small compass of 136 pages Mr. Boulger has succeeded in compiling a very readable account of plant geography. The four divisions of the book deal with the evolution of the plant world, the factors of distribution, floristic regions, and botanical ecology or topography. He has wisely devoted the larger part of the book to the consideration of factors of distribution rather than to detailed accounts of the floras of different regions, since the science of plant geography is so fundamentally bound up with the proper understanding of the ways and means of plant dispersal.

Mendel's Principles of Heredity. By W. Bateson, F.R.S. Pp. xiv+413. (Cambridge University Press, 1913.) Price 12s. net.

A REVIEW of the first edition of Dr. Bateson's valuable conspectus of discoveries in regard to heredity made by the application of Mendel's methods of research, appeared in NATURE of May 25, 1911 (vol. lxxxvi., p. 407). Since then a vast amount of work has been done upon various subjects of Mendelian analysis; and Dr. Bateson has endeavoured to take account of this by a series of appendices giving descriptive references to papers representing advances upon the state of knowledge when the original volume was published. Short of rewriting the book, this was probably the best means of giving a new lease of life to a standard work upon Mendelism by a leading exponent of its principles.

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LETTERS TO THE EDITOR.

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The Spectra of Neon, Hydrogen, and Helium.

IN the issue of NATURE for February 27 (p. 699), Prof. Collie and Mr. Patterson have directed attention to numerous approximate coincidences between lines of neon and hydrogen, from which it is presumably intended to be inferred that certain lines of neon are ordinarily present in the vacuum tube spectrum of hydrogen. A further examination of the observational data, however, seems to be desirable.

Messrs. Collie and Patterson have omitted to state that in the region considered, $\lambda 6507$ to $\lambda 3472$, Watson's list of the secondary spectrum of hydrogen contains more than 700 lines, while that of neon contains 260 lines, of which nearly 100 are of intensity 4 or greater. With spectra of this complexity there is nothing at all remarkable in the occurrence of a considerable number of approximate coincidences between lines belonging to the two spectra. As stated by Messrs. Collie and Patterson, there are, in fact, twenty neon lines of intensity 4 and upwards which fall within a quarter of an Angström unit of lines of hydrogen; while, if all the neon lines are included in the comparison, and differences of wavelength amounting to a whole Angström unit be allowed, the number is brought up to 110.

Messrs. Collie and Patterson, however, do not seem to have realised the accuracy of modern spectroscopic tables, such as they have utilised in the present comparison. A difference of more than a few hundredths of an Angström unit in the tabulated wave-lengths of two lines should now suffice to prove that they have different origins, unless other evidence of probable identity is forthcoming. If the permissible discrepancy be reduced to one-twentieth of an Angström unit, there remain only six lines which might be regarded as possibly common to the two spectra, namely:—

Neon			Hydrogen		
Intensity		Wave-length	Intensity		Wave-length
5	...	6175.09	0	...	6175.14
7	...	6143.31	0	...	6143.30
7	...	5343.40	0	...	5343.43
4	...	4537.93	0	...	4537.91
9	...	3520.61	1	...	3520.60
6	...	3472.68	0	...	3472.65

Thus, of the hundred brightest lines of neon, only six are found in hydrogen within the probable limits of error, and only one of the six brightest is among them. There is no evidence that the six "coincident" neon lines have special properties which would favour their survival, and the coincidences cannot, therefore, be properly regarded as significant. Even twenty such coincidences would not prove a relation between the two spectra, unless it could be shown that the lines in question were the most persistent of the neon spectrum.

A very similar result is indeed obtained when a comparison is made between neon and iron. Over the same range of spectrum there are thirteen of the hundred brighter neon lines which differ by no more than one-twentieth of an Angström unit from iron lines, but this would scarcely be accepted as evidence of any relation between the two spectra.

As regards the comparison of neon with helium, the mean deviation of the three lines noted is 0.16, which